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INDUSTRIAL PREPARATIVE HPLC SYSTEM

PRODUCT MANUAL



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CS-Prep Industrial Preparative HPLC System

As an industrial separation and purification equipment, the industrial preparation liquid chromatography system has the characteristics of high efficiency, rapid, automation, explosion-proof and so on. It is widely used in the separation and purification of medicine, chemical industry, plant, food and other fields, and effectively improves the production efficiency, automation degree, the purity and yield of the product.

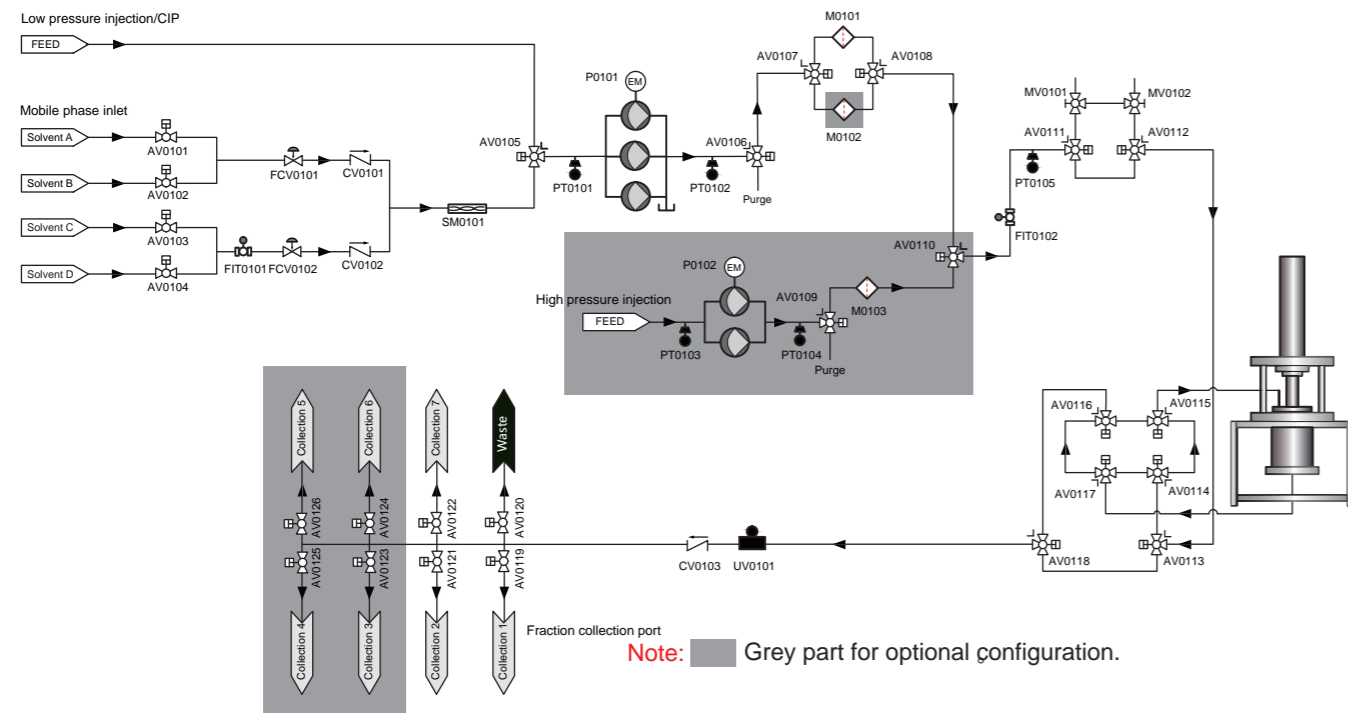
The industrial preparation liquid chromatography system is composed of infusion part, sampling part, detection part, fraction collection part, control part and data processing part. It can achieve balance, sample loading, washing, elution, automatic collection, online cleaning and other processes. System design and verification are in compliance with GMP, cGMP, FDA and other relevant regulations.

Product Features

- Comply with GMP, cGMP and FDA regulations
- The key components are made of well-known brands in the industry
- High precision and high stability.
- Control software based on imported software secondary development, in line with FDA 21CFR Part 11 requirements
- The design and implementation process based on GAMP5 and provide complete GMP and FDA verification documents and services.



Standard Gradient System P&ID Drawing



P&ID Drawing Description

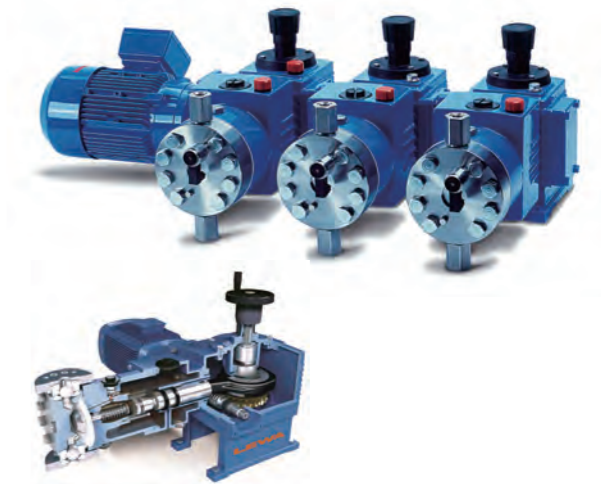
AV0101~AV0104	FCV0101~FCV0102	FIT0101~FIT0102	CV0101~CV0103
Pneumatic two-way ball valve	Flow control valve	Mass flow meter	Check valve
SM0101	AV0105~AV0118	P0101~P0102	PT0101~PT0105
Static mixer	Pneumatic three-way ball valve	Diaphragm pump	Pressure transmitter
M0101~M0103	UV0101	AV0119~AV0126	MV0101~MV0102
Online filter	UV detector	Pneumatic two-way ball valve	Manual three-way ball valve

Key parts

Diaphragm pump

LEWA three-pump head diaphragm metering pump is the core component of CS-Prep industrial liquid chromatography system infusion unit. The pump head adopts DPS diaphragm protection system and diaphragm position control technology, which meets relevant requirements of GMP, cGMP and FDA regulations.

LEWA pump has patent technologies of adjustable eccentric adjustment and piston ring seal design, stroke adjustment uses non-torque transfer mechanism, easy to adjust, good lock performance. When the pump runs or stops, the stroke length can be adjusted within the range of 0-100%. The stroke adjustment system has good linearity, strong reproducibility and high precision.

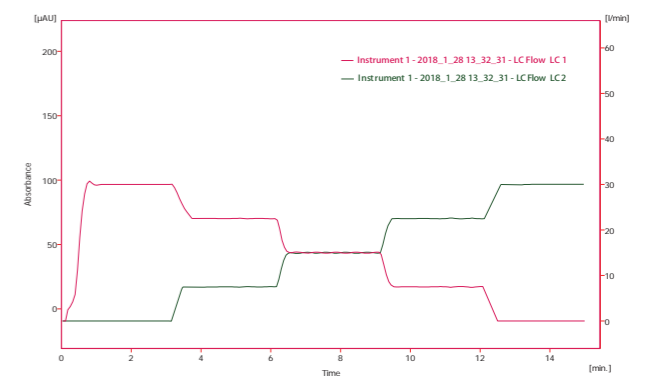
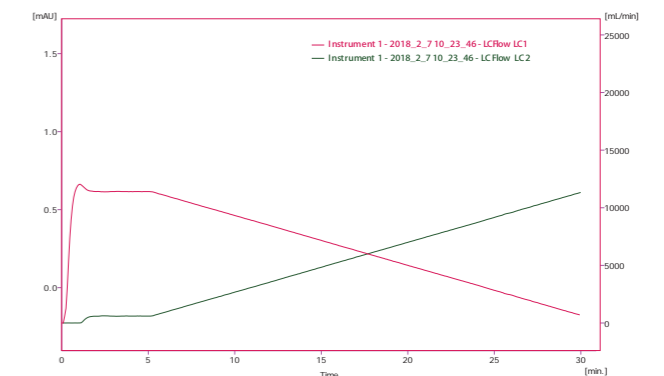


Other key parts

Other key parts of the system are adopted: E+H, EMERSON, MASONEILAN, VSTORK, SWAGELOK, HAMLET, SIEMENS and other international famous brands, which effectively guarantee the stability and reliability of the equipment.



High precision flow gradient control



Control software

The system software supports both Chinese and English, and can set operation parameters according to the production process, including flow rate, valve switch, sample injection time, elution time, collection conditions, etc. It can run automatically or manually according to the preset program. And the process and parameters can be customized. The software is designed in accordance with the requirements of GAMP5 and FDA 21 CFR Part 11, with complete audit trail, electronic record, electronic signature, multi-level user authority management and other functions. All user operations can be recorded, and the software system has full log output and automatic backup functions.

Software features

- Monitor all operating parameters, multiple safety protection and alarm such as pressure and diaphragm broken alarm.
- Friendly operation graphical interface and intuitive editing methods, convenient to achieve all kinds of functions.
- Multi-mode operation, you can choose debug mode, manual mode, automatic mode.
- Follow GAMP 5 and FDA 21 CFR PART 11, with electronic signature and electronic record functions.
- The system is divided into multi-level operation permissions to avoid the operator to change the process parameters at will.
- Multitask hyperthread data processing, the system speed is fast, the processing speed is fast.
- Complete audit trail function, complete data operation log.

Software interface



CS-Prep Industrial Preparative HPLC System Infusion Unit Parameters

Model	CS-Prep 150/200	CS-Prep 300	CS-Prep 400 ~ 500	CS-Prep 600	CS-Prep 800	CS-Prep 1000/1100	CS-Prep 1200	CS-Prep 1600
Pump max flow (L/h)	200	300	500	1200	2000	3000	5000	5000
Chromatography column	DAC150~200	DAC300	DAC400~500	DAC600	DAC800	DAC 1000/1100	DAC1200	DAC1600
Dimension (mm)	2600x1000x1840		3000x1400x2020			3500x1600x2300		
Weight (kg)	1500		2000		2300	2500	3000	
Tube	1/4" or 3/8" ferrule tube		1/2" ferrule tube		3/4" ferrule tube		1" ferrule tube	
Material	ASTM A269(SS316L)							
Max work pressure (bar)	100				70			
Detector	Single wavelength, double wavelength, or four wavelength (200-400nm or 190-700nm)							
Power supply	380VAC 50Hz							
Working temperature (°C)	4~40							
Compressed air (bar)	5~7							
Explosion-proof level	ExdIIBT4							

Note: The above is the reference configuration table of the high pressure preparation system. The actual design also needs to choose the key component model parameters according to the customer's process.

Relevant case

CS-Prep 200
Industrial Preparative HPLC System



CS-Prep 800
Industrial Preparative HPLC System



CS-Prep 600
Industrial Preparative HPLC System



CS-Prep 1200
Industrial Preparative HPLC System



Dynamic Axial Compression Chromatography Column

DAC Column (Dynamic Axial Compression Column, hereinafter referred to as DAC). It has the most mature column loading technology in the field of preparative chromatography, can install column by itself, maintain column pressure and unload column by itself, as well as the functions of chromatography column and multi-function column. The DAC packing chromatography column meets the requirements of column bed continuity, uniformity, stability and compactness, and eliminates the influence of column bed collapse.

In 2005, Hanbon first developed a dynamic axial compression column with independent intellectual property rights, and has built a well-scaled production and assembly workshop for dynamic axial compression column. After continuous upgrading, the products have been recognized by the domestic and foreign markets and exported to more than 20 countries such as India, South Korea, Norway, Hungary, Germany, the United Kingdom and Russia. Hanbon provides users with dynamic axial compression column diameter range from 50mm to 2000mm, we can provide customized services for you.



DAC-50



DAC-80/100



DAC-150

Product Features

- Mature product, stable performance
- Independent intellectual property rights, with a number of patent technologies
 Invention Patent (Patent No. : ZL201710510855.2)
 Utility Model Patent (Patent No. : ZL201822028893.7)
 Design Patent (Patent No. : ZL201930036057.0)
- Excellent distributor design for linear amplification
- Perfect supporting equipment, easy to operate, fast
- Chromatographic column size: diameter of 50~2000mm, can be customized according to requirements.

■ DAC-50 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	50mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	Dimension	600*600*2100mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-80/100 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	80/100mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	Dimension	600*600*2300mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-150 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	150mm
2	Column tube length	680mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	Dimension	650*650*2350mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

Dynamic Axial Compression Chromatography Column



■ DAC-200 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	200mm
2	Column tube length	680mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	Dimension	650*650*2450mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-300 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	300mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	Dimension	900*900*2750mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-400/450 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	400/450mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking
7	DAC400 dimension	1200*1200*3200mm
	DAC450 dimension	1350*1350*3500mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-500/600 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	500/600mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤10MPa
6	End cap connection method	Chain clamp quick locking / Bolted connection
7	DAC500 dimension	1450*1950*3500mm
	DAC600 dimension	1650*2150*3750mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

Dynamic Axial Compression Chromatography Column



DAC-800



DAC-1000,1100,1200,1600

■ DAC-800 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	800mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤7MPa
6	End cap connection method	Bolted connection
7	Dimension	1900*2400*4300mm
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

■ DAC-1000,1100,1200,1600 Technical Parameters

No.	Configuration	Parameter
1	Column tube ID	1000/1100/1200/1600mm
2	Column tube length	650mm (standard)
3	Column tube surface roughness	≤0.2μm
4	Effective packing height	≤450mm
5	Max pressure resistance	≤7MPa
6	End cap connection method	Bolted connection
7	DAC1000 dimension	4200*2200*4500mm
	DAC1100 dimension	4750*2350*4500mm
	DAC1200 dimension	4800*2400*4700mm
	DAC1600 dimension	Customized
8	Packing method	Down packing

*Column length, max pressure resistance can be customized according to user requirements.

Key parts

■ Piston, end cap, column tube

The filter frit of dynamic axial compression column adopts international famous brand to ensure the filter frit is flat and the aperture is uniform.

The column tube is processed by integral forging, rolling, solid solution and other processes. The inner wall of the column tube is polished to ensure the internal smoothness, which greatly reduces the column wall effect and improves the performance of the column.



■ Support equipment



Piston turn equipment



Piston storage rack



End cap storage rack

Slurry System

The slurry tank volume can be customized according to the specification of the chromatography column. The key parts are imported with stable and reliable performance.

The small volume slurry tank uses the pneumatic diaphragm pump to circulate and transfer the slurry. The agitator is the pneumatic motor type, and can adjust the stirring speed by adjusting the air pressure. The blades designed with low shear force can avoid damage of packing material. The mixing mode of explosion-proof variable frequency motor is adopted for large volume slurry tank. Lock the pressure regulator to the required air pressure to avoid misoperation. The slurry tank top is equipped with CIP cleaning ball, which can realize online cleaning.

Vacuum feeding device is optional. It can effectively avoid dust and ensure personnel health and safety.



▲ Optional



▲ Standard

Product Features

- The key components of the system adopt first-line brand with reliable performance.
- Wetted parts materials include 316L, PTFE and TEFLON, Ra ≤0.4um
- Low shear force agitator, no damage to packing material.
- Using spray ball design, CIP cleaning can be realized.

Configuration parameters

Configuration	ST50	ST100	ST150	ST200	ST400	ST600	ST800	ST1000
Rated volume (L)	50	100	150	200	400	600	800	1000
Driven method	Pneumatic motor				Explosion-proof motor			
Seal method	Mechanical seal							
Infusion method	Pneumatic diaphragm pump							
Dimension (mm)	800x500x1700	900x530x1850	1000x700x1950	1000x700x2100	1050x850x2400	1350x900x2550	1450x1000x2750	1550x1100x2900
Weight (kg)	165	200	230	255	295	330	530	600
Compressed air (bar)	5-7							
Working temperature(°C)	4-40							
Power (KW)	/				0.55	1.1	2.2	2.2

Pre-column & System

Fermentation, extraction and synthesis of products, after the pre-treatment of filtration, decolorization, centrifugation and other processes, there will still be a small part of impurities and pigments. The packing material used in the dynamic axial compression column is expensive, and in order to protect the packing material and filter frit of the large diameter dynamic axial compression column, sample pretreatment is usually required. The pretreatment column still adopts DAC loading method, and uses the large particle chromatography packing material. The sample is input into the pretreatment column through the pretreatment system, and stored in the sample storage tank after preliminarily purified.

Product Features

- Mature product, stable performance
- Perfect supporting device, easy and convenient to operate
- Specification of pretreatment column: diameter of 50-600mm



Industrial preparative HPLC system with plunger pump

In order to meet the needs of some users, Hanbang has independently developed the large-flow plunger pump type industrial preparation liquid chromatography system, which adopts the multi-pump head structure design to effectively reduce the flow pulse.

Plunger Pump industrial preparation Liquid chromatography system infusion unit has high performance-price ratio, good self-suction performance and high volume efficiency.

Product Features

- High rated pressure, stable flow rate
- Convenient cleaning
- Simple structure



Plunger pump industrial preparation liquid chromatography system infusion unit parameters

Model	3L Infusion Pump	5L Infusion Pump	10L Infusion Pump	20L Infusion Pump	30L Infusion Pump	40L Infusion Pump	50L Infusion Pump	80L Infusion Pump
Pump head Qty.	5	5	5	5	5	7	7	7
Flow range	0.3~3L/min	0.5~5L/min	1~10L/min	2~20L/min	3~30L/min	4~40L/min	5~50L/min	8~80L/min
Inlet tube	3/8"	1/2"	3/4"	3/4"	1"	1.1/4"	1.1/2"	1.1/2"
Outlet tube	1/4"	3/8"	1/2"	1/2"	3/4"	1"	1.1/4"	1.1/4"
Motor power (KW)	2.2	2.2	4	7.5	11	15	18.5	22
Dimension (mm)	735×650×1000	735×650×1000	860×1000×1100	860×1040×1300	1000×1200×1400	1200×1220×1400	1400×1300×1650	1500×1300×1700
Weight (kg)	180	200	280	340	420	460	500	560
Flow accuracy	±1.5%							
Work pressure (MPa)	≤10							
Working temperature (°C)	4~40							

Note: The above is the reference configuration table for the plunger pump industrial preparation liquid chromatography system. The actual design and key components may vary.

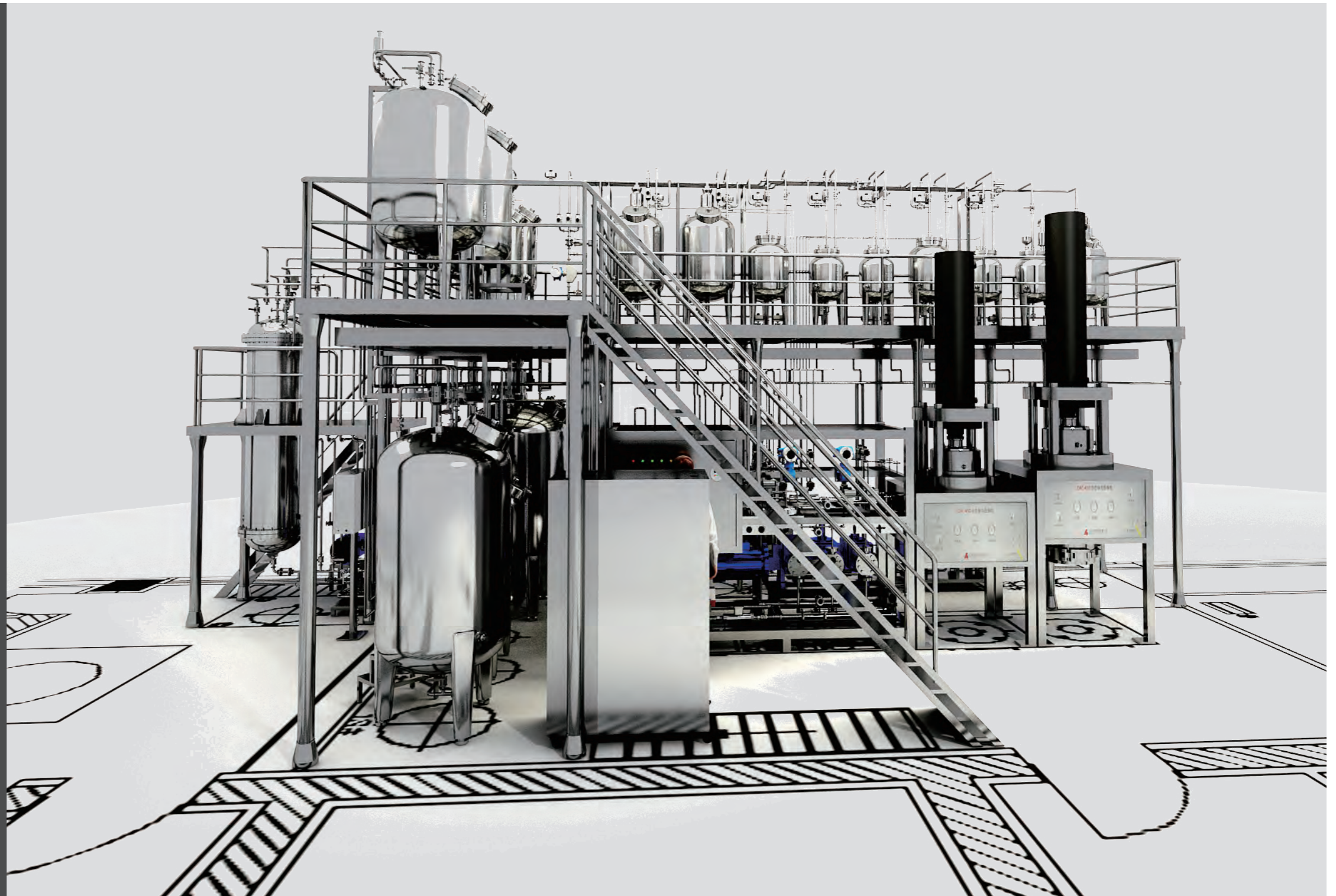
Pharmaceutical Industry Overall Solution

Description

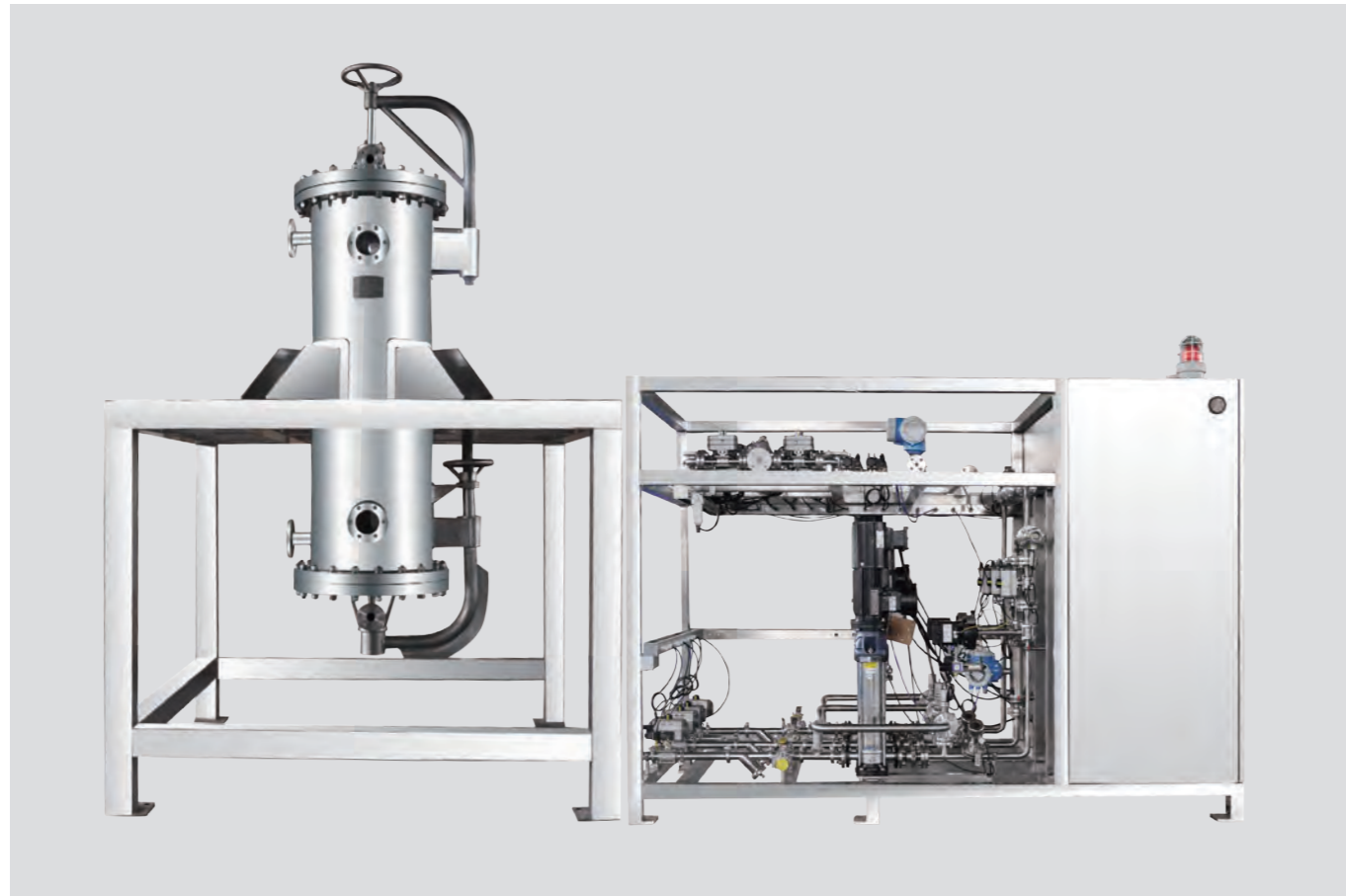
Hanbon provides customers with the design and implementation of integrated solutions based on high chromatography purification process.

The overall solution covers different stages: process development pilot scale, industrial production line implementation, etc. The services provided include but not limited to: sample treatment system, chromatography purification system (high, medium, low pressure), solvent recovery and automatic control of the whole system, design of public projects, selection, supply, installation and pipeline construction of the corresponding production line equipment, as well as verification documents in line with GMP requirements.

During the process of technology development, Hanbon continuously does research and development and use of advanced pharmaceutical technology (such as: online fast detection/monitoring technology, automatic solvent mixing technology, pervaporation separation technology, membrane treatment technology, super gravity rotating distillation technology, etc.), with help of the industrial preparative chromatography system, SMB, continuous ion exchange system and SFC, etc., to continuously optimize customer's production process, improve production efficiency, increase product yield, improve product quality, reduce material use, energy consumption and environment pollution.



Low Pressure Silica Gel Column & System



Product Description

Hanbon applies the design concept of DAC dynamic axial compression column to low-pressure silica gel column, and adopts advanced distributor structure design to ensure good distribution effect and high efficiency of material purification. The structure design of silica gel column can adopt upper and lower plate head or upper piston DAC drive to maintain the stability of silica gel column bed.

The loading and unloading of silica gel column is always a thorny problem. Due to the use of positive phase mobile phase system, flammable, explosive, harmful to the human body. Hanbon adopts the patented design to realize the automatic loading and unloading of the silica gel column under sealed condition, which fundamentally solves the problem of using the silica gel column.

Patent No.: ZL201720755067.5
ZL201721264892.1

Low Pressure Resin Chromatography Column & System



Product Description

On the traditional low-pressure resin chromatography column and system, Hanbon technology continuously improves the structure design of resin bed, adopts multi-layer sintered filter screen instead of the traditional filter cap structure, the column head distribution is more reasonable, can provide stainless steel, PP, lining halal, F40 and other materials.

In the infusion system control unit, the traditional methods of manual operation and sampling detection are changed to realize the functions of automatic process control, on-line monitoring/detection, automatic collection, solvent recovery and so on. Greatly save equipment and plant floor area, reduce the risk of human operation and reduce labor costs.

On-line Fast Detection/ Monitoring System



Product Description

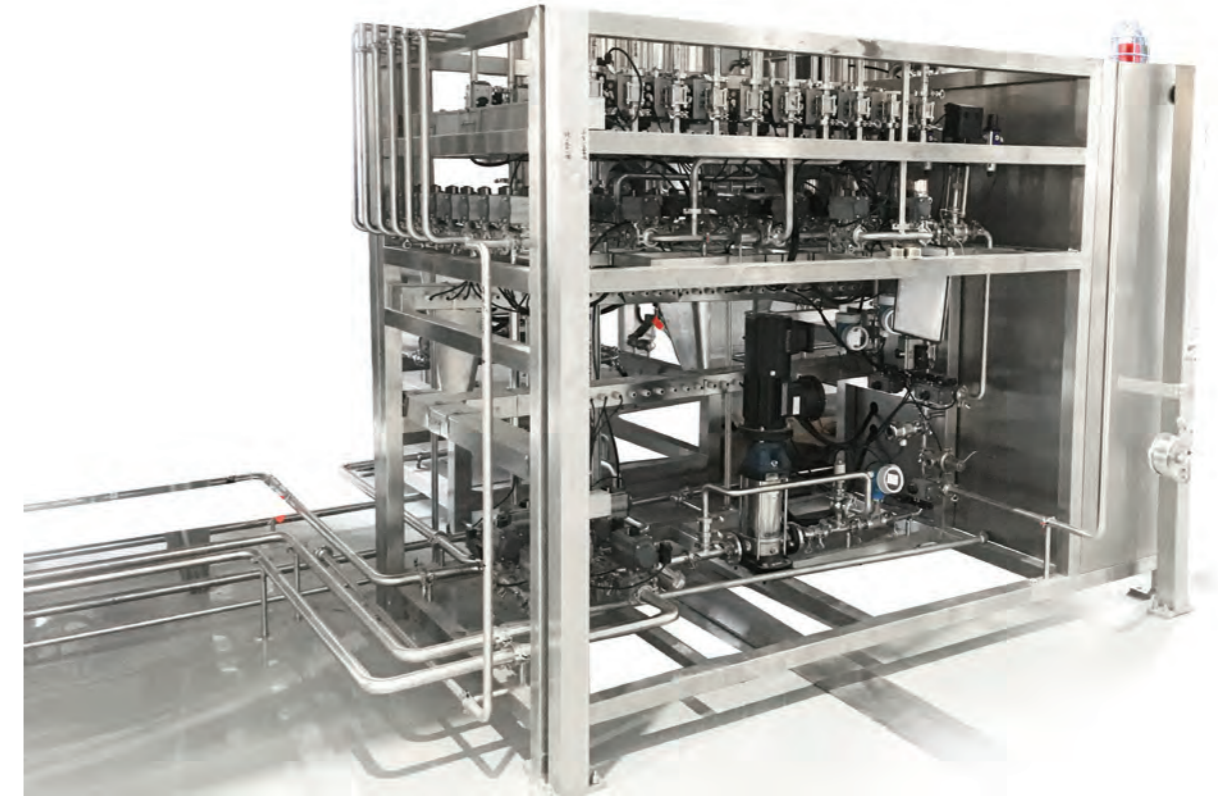
The chromatography column can realize quickly online detection or process monitored and process analyzed, avoiding manual sampling and sample injection. The system can control the elution pump, the elution valve and the collection valve in real time according to the user-defined parameters, extend to automated systems.

An on-line rapid detection/monitoring system allows simultaneous monitoring of multiple chromatography columns.

Product Features

- Realize full automation of online sampling, online dilution, sampling, detection and analysis
- Avoid manual sampling, inspection, reinspection, etc. to save labor costs.
- The detection results automatically control the tank switch to avoid human error
- Save tanks, save space
- Customized according to user requirements, extended to automatic control system
- The software conforms to FDA 21 CFR Part 11 requirements.

Automatic Desolved System



Product Description

Automatic solvent mixing system is a new type of liquid mixing technology, which can monitor the concentration of solvent on line, realize the online automatic proportion and monitoring of solvent through mass flow meter, flow control valve and on line mixer, etc., and guarantee the precision and stability of liquid mixing through advanced closed-loop control technology.

Product Features

- Stable ratio and good reproducibility
- Safe and reliable, high level of automation
- Save workshop space and storage tank input, reduce production costs
- Reduce the safety problems caused by volatilization organic solvents
- Reduce labor costs
- Horizontal and vertical modes are available according to the workshop layout.